



2016 Virginia Concrete Conference

Changes to Division IV of the Road and Bridge Specifications

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Structure and Bridge Division

March 3, 2016

Division IV Specifications Updates

- **Specification is 9 years old and may not be published for another 9 years**
- **Includes previously unaddressed maintenance topics. Emphasis had been on new structures**
- **Formally incorporate special provisions**
- **Addresses advances in technology**
- **Focuses on measurable elements of quality**
- **Developed in conjunction with industry**

Presentation Outline

- **Why Make Changes**
- **Principles Used**
- **Highlights of Changes**

Why Make Changes?

1. **Specifications are just one part of the construction quality equation**
2. **Properly written specifications are NOT a guarantee of quality, but they are the foundation and must provide clear expectations**

Specifications are Part of A Legal Document

**The first thing we do,
let's kill all the lawyers**

Shakespeare's Henry VI

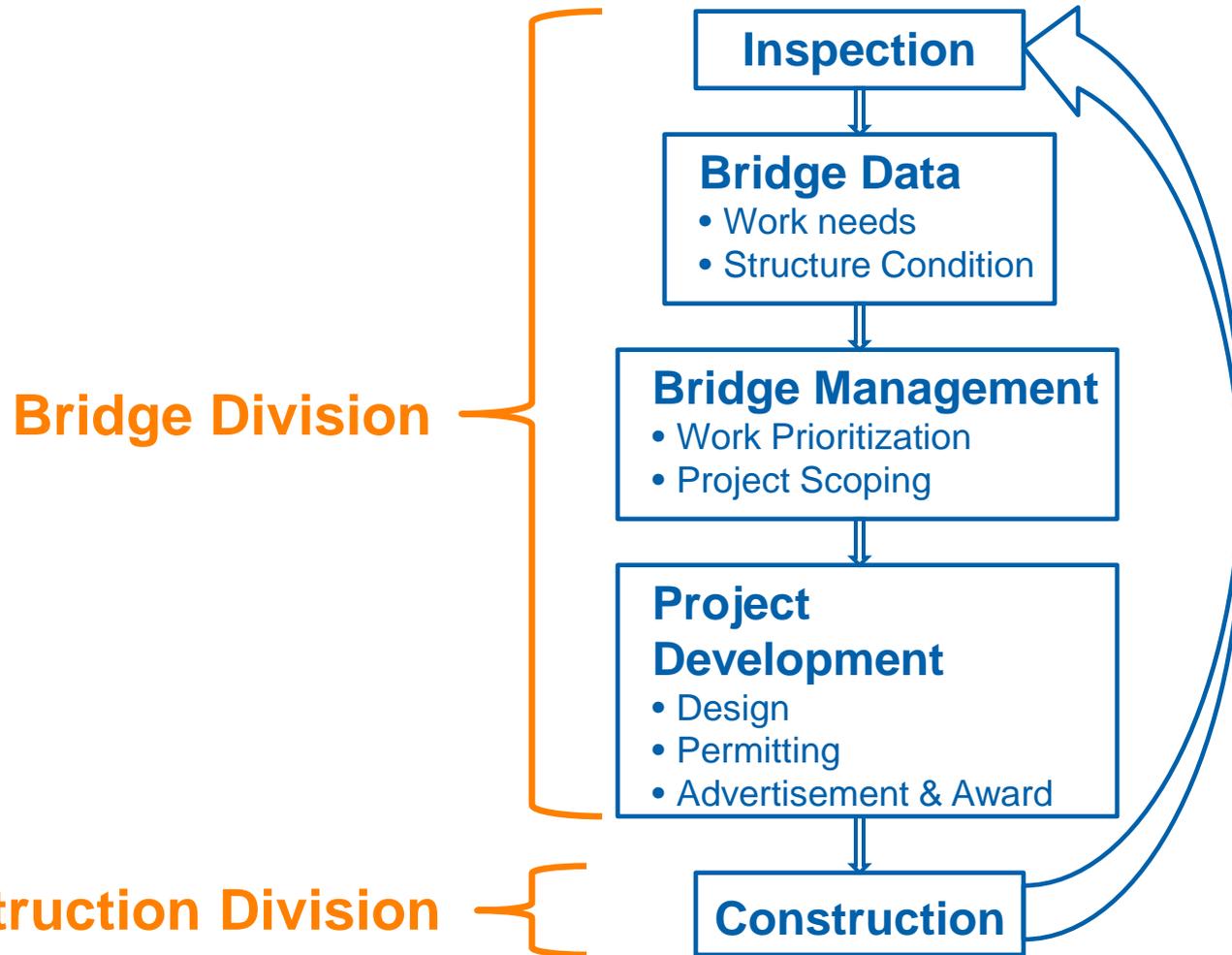
At some level we're all lawyers. Anyone reading a specification is making a legal interpretation

Why Make Changes?

VDOT has Serious Concerns About the Quality of Bridge Repair and Construction

A Sense of Ownership

VDOT's District Bridge Offices Are Responsible for Bridges at Every Step of the Process (Except One!)





Performance Safety Condition Projects Citizen Survey Finances Management

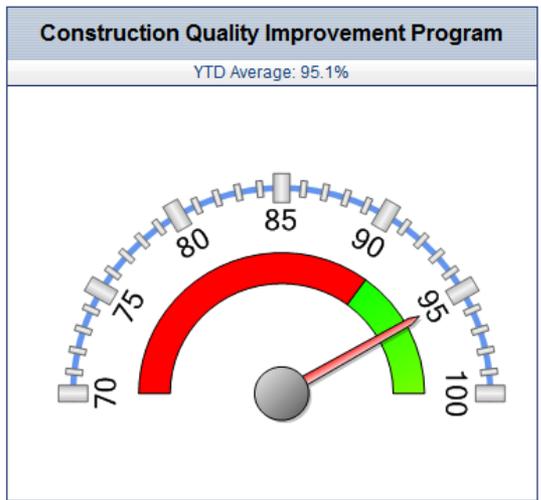
HOME HELP QUICK START FEEDBACK

Project Development Project Delivery District Watchlist CQIP

Garrett W. Moore, P.E. Deputy Commissioner Chief Engineer Kerry A. Bates, P.E. State Construction Engineer

Construction Quality Improvement Program

District: [Statewide] Date Range: FY2016



Information on the CQIP Measure

How to use this measure

Construction and Maintenance projects from all over the Commonwealth are selected for special review. Compliance with contract and plan specifications is evaluated on these active projects. There are over 1100 individual items in the review checklist; only those that apply at the time of the review are evaluated and included in the results.

Each of the applicable items in the checklist is rated as 'compliant' or 'non-compliant'. The percent of compliant items is then calculated for each checklist section and for overall compliance. The target is to meet or exceed 91% overall compliance.

The results are grouped into six sections including things like Bridges and Structures, Roadway, Traffic, Incidental Construction, and so on.

Individual Districts may be selected, as well as some earlier years, from the drop-down filters. The tab labeled "Trends" shows the summary results for earlier years.

Details Trends

Section	Cumulative FYTD Compliance Rating
Bridges and Structures	97.8 %
General Provisions	93.5 %
Incidental Construction	94.0 %
Roadside Development	94.5 %
Roadway Construction	98.5 %
Traffic Control Devices	94.9 %
Total	95.1 %

➤ VDOT uses CQIP (Construction Quality Improvement Program) as an indicator of quality

➤ Poor correlation between quality of project and CQIP

➤ Need better ways to measure quality and expectations



Performance Safety Condition Projects Citizen Survey Finances Management

HOME HELP QUICK START FEEDBACK

VDOT Managed Local Government Projects P3 Projects

Project Development Project Delivery District Watchlist CQIP

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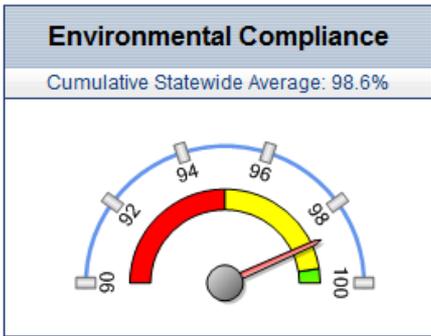
Project Delivery

Project Search

District: Counties Residencies Cities
 Road System: All Road Systems
 Date Range: Current FY
 Show More Filters

On Time: 85%			
(FY2016 Target: 77%)			
	Active	Completed	Total
R	25	44	69
Y	3	0	3
G	32	375	407
Total	60	419	479

On Budget: 95%			
(FY2016 Target: 85%)			
	Active	Completed	Total
R	3	8	11
Y	11	3	14
G	46	408	454
Total	60	419	479



Financial Disclaimer: The dollar costs shown in the On-Budget section represent most of the cost of the project. However, the final payment to a contractor may not be known at this time, and there may be incidental costs, such as fuel adjustments, incentive payments, and material allowances, which are not included. Also, the extent of any potential claims may not be known at the time a project is completed, and are not included in the calculations.

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Virginia Performs 511 Virginia

VDOT Dashboard measures “On-Time” and “On Budget”

➤ There is a natural tendency to emphasize budget and schedule over quality

Why Make Changes?

**A Request to District Bridge Engineers for
Examples of Poor Construction Quality Returned
Disturbing Results**

Type C Patch



11/19/2013







**District Bridge Offices Find Problems
During Acceptance Inspections**

How Do We Respond to the Problem?



Elements of Quality

Element	Requirements/Resources
<p>Knowledge</p> <ul style="list-style-type: none"> ➤ Contractors ➤ Inspectors 	<ul style="list-style-type: none"> ➤ Training ➤ Experience
<p>Skills</p> <ul style="list-style-type: none"> ➤ Techniques ➤ Equipment 	<ul style="list-style-type: none"> ➤ Contractor Experience ➤ Best Technology
<p>Materials</p> <ul style="list-style-type: none"> ➤ Clearly Defined Requirements ➤ Availability 	<ul style="list-style-type: none"> ➤ Tests ➤ Material Certifications
<p>Expectations</p>	<ul style="list-style-type: none"> ➤ Specifications ➤ Inspector Knowledge

The Path to Quality Improvement

- **Improved Training**
 - **Inspectors**
 - **Contractors**
 - **Higher Level Certifications?**

- **Better Measurements of Quality**
 - **CQIP Changes**
 - **Objective Measurements**

- **Better Resources for Learning Best Practices**
 - **Web Site with Videos and Current Written Guidance**

- ***Improved Specifications***

Principles Used – Measurements of Quality

- 1. What elements of quality are most important to us?**
- 2. Can we objectively measure those elements**
- 3. Where objective measurements are possible, include as requirements in specification**
- 4. Clearly state acceptable limits**
- 5. Distinguish between problems that are the contractor's responsibility and those that are not**
- 6. Clearly state consequences when work does not meet requirements**

Examples of Measurements

Deck Concrete

- **Contractor to measure depth of cover**
 - If out of tolerance, contractor to mitigate with epoxy overlay
- **Plastic shrinkage cracks over .01 inch are to be repaired at contractor's expense**
- **Contractor is not responsible for the cost of repairing drying shrinkage cracks**
 - Low cracking deck concrete specification

Drying Shrinkage Cracks: *Not the Contractor's* Responsibility



Low cracking deck concrete spec. is intended to greatly reduce incident rates of these cracks

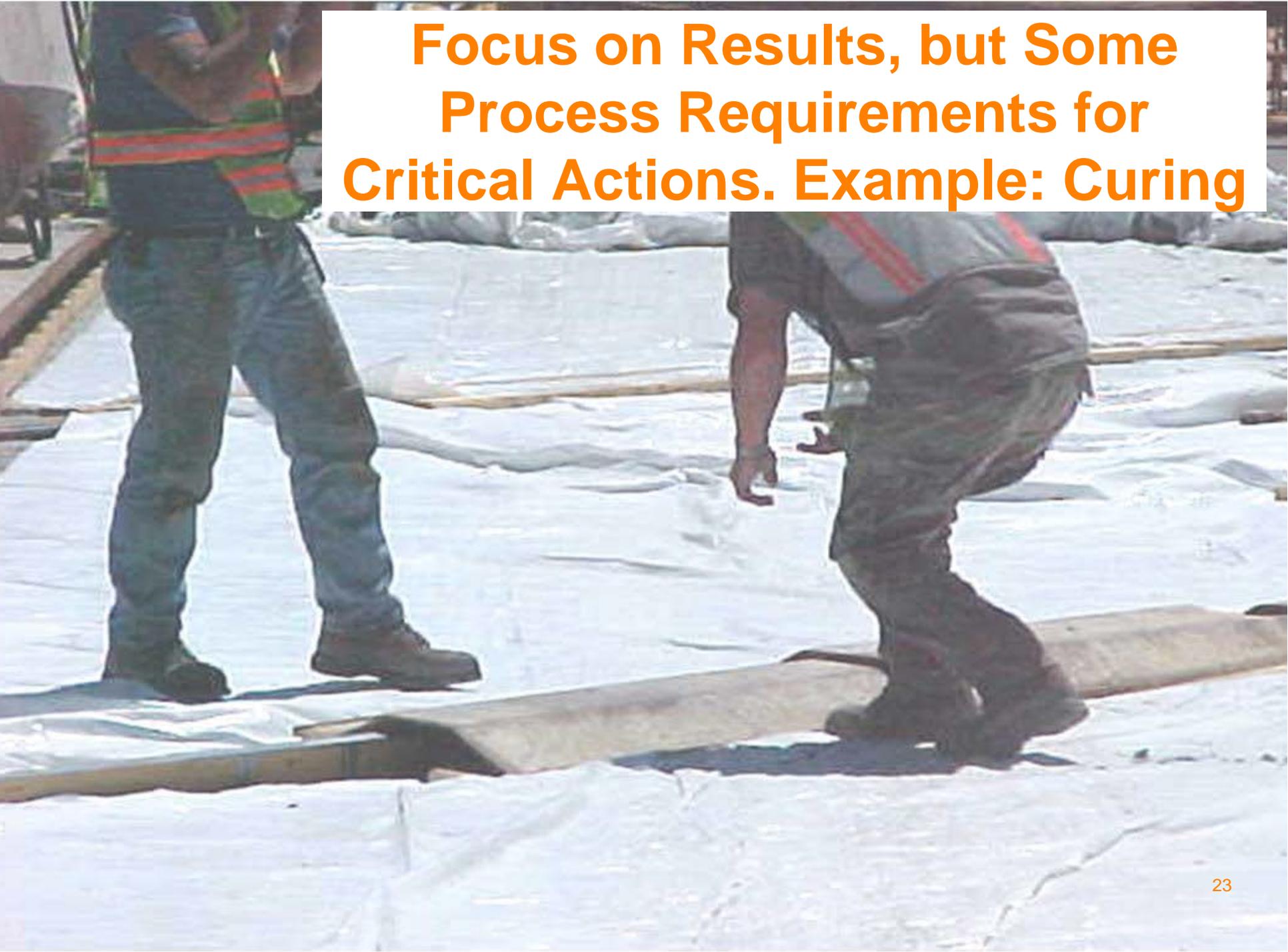
**Contractor is Responsible for Plastic Shrinkage Cracks:
Repair required for Cracks $>.01$ inch**



Principles Used – General

1. Clarify vague language
2. Incorporate new(er) technology
3. Focus on results over process, but disallow practices that yield poor results

**Focus on Results, but Some
Process Requirements for
Critical Actions. Example: Curing**



Requirements for New Technologies Hydrodemolition





New Section on Repair of Damaged Steel

Incorporation of former “Special Provisions” - Rigid Concrete Overlays -



A Few More Things to Note

- 1. Contractor to submit a photo of deck patch with pay requests (taken prior to placement of material)**
- 2. Deck patching over 6 ft³ must be mixed with high precision mobile mixer or ready mix**
- 3. Galvanic anodes required in concrete patches**
- 4. Thin bonded (epoxy) overlays to extend partially up the inside face of the bridge barrier**
- 5. Self consolidating concrete is the default material for substructure surface repair. Shotcrete allowed with prior written permission**
- 6. DTI washers required for high strength bolts**

A Few More Things to Note

- 7. Soluble salt remover and test required prior to coating application**
- 8. Procedures for concrete beam repair provided**
- 9. Compression seal deck expansion joints disallowed**
- 10. Asphalt overlays require approved membranes**
- 11. New sections for:**
 - Steel repair**
 - Concrete overlays**
 - Epoxy overlays**
 - Various joint types**

A Few More Things to Note

Where possible, authoritarian tone removed from language



Many Projects Are Properly Built!



Thank you for your time and attention

Questions??